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## **Analysis of Peptides and Proteins Affinity-Bound to Iron Oxide Nanoparticles by MALDI MS**

Sarah Y. Chang<sup>1</sup>, Nan-Yan Zheng<sup>2</sup>, C. R. Chris Wang<sup>3</sup>

<sup>1</sup>Department of Chemistry, Tunghai University, Taichung, Taiwan 407

<sup>2</sup> Department of Applied Chemistry, Chaoyang University of Technology, Wufong, Taichung County, Taiwan, 413

<sup>3</sup>Department of Chemistry and Biochemistry, National Chung Cheng University, Min-Hsiung, Chia-Yi, Taiwan 621

Correspondence e-mail address: ychang@thu.edu.tw

### **Abstract**

Iron oxide nanoparticles modified with oleate have been employed to the extraction of peptides and proteins from aqueous solution prior to matrix-assisted laser desorption/ionization (MALDI) mass spectrometric (MS) analysis. Adsorption of peptides and proteins onto the nanoparticles were mainly through electrostatic attraction and hydrophobic interaction. The analyte-adsorbed iron oxide nanoparticles could be efficiently collected from solution using a magnet. No elution step was needed. With this preconcentration strategy, the lowest detectable concentration of angiotensin I, insulin and myoglobin in 500  $\mu$ L of aqueous solution were 0.1 nM, 0.1 nM and 10.0 nM, respectively. In addition, the nanoparticles could extract the analytes from solution with a high content of salt and surfactant, thus eliminating suppression effect during MALDI MS analysis. This method was successfully applied to concentrate the tryptic digest products of cytochrome c. In addition, the tryptic digestion of cytochrome c can be directly conducted on the iron oxide nanoparticles.

Keywords: iron oxide nanoparticle, peptides, proteins